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ABSTRACT

In the most adequate psycholinguistic model of the reading process the proficient silent reader decodes directly from graphic surface structure into deep structure, with no decoding into oral surface structure. Three cue systems used by all proficient readers include graphic cues (letters and words), syntactic cues (the grammatical arrangement of words), and semantic cues (the meaning of the words and concepts that the reader brings to the reading process). Reading is a four step process: (1) sampling words and phrases, (2) predicting other words and phrases that might follow, (3) testing the predictions, and (4) confirming or correcting the predictions. Aids for anlayzing how well a reader uses cue systems include the cloze procedure and miscue analysis: the latter tests the difference between text and the reader's oral response. (DF)

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# An Overview of Psycholinguistic Reading Theory

Because we all know how to read, defining that act may appear easy enough to do. Actually, the cognitive gymnastics we go through when we read are difficult to describe objectively. The most useful definitions I have found derive their usefulness from their generality and simplicity. Kenneth Goodman, for instance, insists that "Reading must . . . be regarded as an interaction between the reader and written language, through which the reader attempts to reconstruct a message from the writer."[1] More succinctly, "reading is not reading unless there is some degree of comprehension. . . ."[2] This emphasis on comprehension has led psycholinguistic reading theorists to contend that reading instruction should stress students' abilities to decode graphic symbols for meaning, and not merely insist upon students' abilities to recode graphic symbols into sounds.

Frank Smith has noted in Psycholinguistics and Reading that the impetus for current cognitive approaches toward reading has come from work of Noam Chomsky and the generative transformational school of linguistics. Specifically, that school offers two relevant theories. The first one suggests a distinction between the physical aspect of language (the surface structure) and the underlying meaning of language (the deep structure). Bridging these two levels are grammatical rules that govern the meaningful arrangement of surface structure elements. Only because each of us has a fully developed grammar can we distinguish between the surface structures of "man bites dog" and "dog bites man" or comprehend the difference between a "Maltese cross" and a "cross Maltese."[3]

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The second contribution of the Chomskian school involves the creative aspects of language; that is, a person's grammar provides "a set of rules for generating (and recognizing) an infinite number of grammatical sentences."[4] Because proficient readers can and do recognize various grammatical structures, they actually bring more understanding to the text than the text's words provide.

These two theories have led Frank Smith to a statement that lays the foundation for a psycholinguistic attitude toward reading. "Reading," he writes, "is not primarily a visual process."[5] As one might expect, such a seemingly heretical assertion suggests a number of implications.

One implication is that the more a reader brings to a text, the less visual information he or she will need to identify a letter, a word, or the meaning in a sentence. Conversely, the more visual information a reader needs in order to draw meaning from a text, the slower and less meaningful the reading tends to be.[6] There is, in fact, a strict limit to the amount of information the visual system can process in a given time. To illustrate: Paul Kolers and M. T. Katzman conducted an experiment with proficient college readers in which the experimenters flashed onto a screen a series of six-letter sequences, some of which were words and some were not. They found that if each letter remained on the screen longer than a quarter of a second, the subjects could often remember and correctly identify the individual letters in a sequence, but could not often remember words that the six-letter sequences spelled. However, when each letter in a sequence was flashed for only one-sixteenth of a second (half the first time), the subjects were much less likely to identify correctly individual letters than they were to remember the words the letters spelled. From this Kolers infers, first, that "If normal reading is preceded by a serial scan on a letter-by-letter basis, its

maximum rate would be between . . . thirty and forty-two words per minute."[7] Second, Kolers concludes that "recognition of words has only a limited dependence on the recognition or 'discriminability' of individual letters."[8] Reading, then, appears to be much more than a visual process during which a reader has to see and identify every letter or word to gain meaning.

With this in mind, we can turn our attention to psycholinguistic models of the reading process. You see in the appendix five models. The first model illustrates a conventional and incomplete theory of the reading process. Evidence supporting the theory of deep structure is the basis of that model's inadequacy, for it omits a crucial step, comprehending the syntactic and semantic messages of the surface structures of written and spoken language. The second model allows for the deep structure, but it misarranges the steps. As Smith points out, "it is not possible to go from the surface structure of written language to the surface structure of speech without meaning, without the deep structure of written language."[9] True, a person may be able to recode the graphic symbols on the page into speech sounds. But this person who reads letter by letter or word by word is probably parroting sounds, not reading for meaning. The proficient reader, however, decodes the deep structure from the surface structure of the written language, then recodes that meaning into the surface structure of the spoken language, and finally decodes the meaning of that. Model 3 illustrates that process. However, since both deep structures are the same, there is no need for the second decoding. In the model for reading aloud, then, readers scan the printed surface structure, decode its deep structure, and then recode that message into the surface structure of speech. See model 4. And the proficient silent reader decodes directly from graphic

surface structure into deep structure. See model 5.

Is there evidence that such a process actually takes place? Again, Kolers offers persuasive proof, this time in studies involving bilingual speakers and writers of English and French.

In one experiment, Kolers found that if he flashed, one at a time, a list of words onto a screen, the subjects could more frequently remember words that had appeared twice than words that had appeared only once. More to the point, if, for instance, the word "desk" appeared twice and if the words "snow" and its French synonym "neige" appeared only once each, the subjects could just as frequently remember the word "desk" as they could "snow." Readers tend to perceive and remember words in terms of their semantic meanings, not their graphic appearances.[10]

Kolers also had bilingual students read aloud a passage in which English phrases and sentences alternated with French phrases and sentences. First, he found that when the text changed from English to French--or vice-versa--the readers often read the beginning word of the French passage with an English accent. Kolers infers, then, that "reading is not simply a matter of translating visual graphemes into phonemes."[11] Moreover, the subjects reading these mixed-language texts often translated words in one language to corresponding words in the other language. A subject might read "book" when the text actually read "livre." The bilingual students would also adjust syntax to fit meaning. They would smoothly continue reading or translating in English, for instance, even after the text had changed to an idiomatic phrase in French. The subjects made these changes without any loss of comprehension and without even realizing they had done so.[12] Clearly, they were decoding the deep structure, not the surface structure. Again, skillful reading involves more than recoding graphic surface structure into oral surface structure. It involves recognizing the graphic signs

and their arrangement (syntax) and above all involves understanding the underlying meaning those symbols and patterns represent.

This emphasis on graphic symbols, their syntax, and their meaning implies three cue systems that all proficient readers use: graphic cues (letters and words); syntactic cues (the grammatical arrangement of the words); and semantic cues (the meaning of the words and concepts that the reader brings to the reading process). These cues seem to be derived from the trinity of surface structure, grammar, and deep structure. While these cue systems might at first appear to be arranged in the order that a reader uses them, actually they are not. A reader uses all three simultaneously.

But there is a process at work, which has four steps: sampling, predicting, testing, and confirming. Briefly, readers sample the words and phrases, usually with the eye moving about four words ahead of utterance. Then, using their intuitive syntactic knowledge, they predict other words or phrases that grammatically and semantically might follow what they have already read. As the eye moves on, readers test the predictions they make to determine if those predictions fit into the syntax and meaning of upcoming phrases. Finally, the readers either confirm or correct their predictions. Whether they confirm or correct depends on if what they read makes sense. For the third time, reading means comprehending.

If this theory of what goes on when a reader reads seems complex to you, you are not alone. It seems complex to me also. And if this model of reading seems complex in theory, the actual practice--when a human being injects his or her own idiosyncratic personality into the process--must be more complex, if not even chaotic. How can we hope to understand what one of our students is doing right and what wrong, let alone what we can do as teachers to help the student become a more efficient reader? At least two methods have

developed as aids in analyzing how well a reader uses all the cue systems available and how efficiently he or she makes use of the cyclical nature of reading. These two are the cloze procedure and miscue analysis. The next paper in this section will discuss the cloze procedure in detail. Right now I wish to turn to miscue analysis.

Miscue analysis is a procedure developed by Kenneth Goodman as an aid in understanding what is going on when a reader reads. Goodman himself has called it a "window on the reading process." A miscue is simply a difference between a text and a reader's oral response to that text. A miscue analysis attempts to describe, in a systematic manner, the miscues performed by a reader so that the teacher can devise ways to help that student in overcoming the miscues that hinder comprehension.

The procedure of miscue analysis starts out simply enough. A story or other reading is selected which is somewhat difficult for the student. The student then reads the story into a tape recorder. Before the student reads, the teacher mentions that the reading will not be graded but the student will be asked to retell the story after the reading is over and that no help will be given during the reading. The student will have to do the best he or she can to handle any problems. As the student reads, the teacher marks all the miscues on a worksheet which is simply a copy of the story typed so it preserves the lines exactly as they are in the book. Goodman has developed a system of symbols to mark the miscues. Of course, too much will happen as the student reads for the teacher to be able to mark all the miscues, so the marking of the worksheet is completed at a later time from the tape recording. After the student is finished reading, he or she simply retells the story without looking back at the text. This part is also recorded. After the retelling, the teacher asks open-ended questions to probe areas omitted in the retelling.[13]

After the session with the student is over, the teacher completes the worksheet from the tape recording and then codes the miscues. Several taxonomies of coding are available ranging from the highly sophisticated--and time consuming--to the much simpler and easier to use. All the taxonomies are designed to highlight the pattern of miscues. And, "because miscue analysis gets at the process and goes beyond the superficial, it produces information that can become the basis for specific instruction."[14]

In order to devise these specific instructions the teacher must analyze the patterns behind the miscues. As Constance Weaver says, "Basically, the teacher needs to find out three things: 1) Does the reader use preceding syntactic and semantic context to predict what is coming next? 2) Does the reader use following syntactic and semantic context to confirm or reject these predictions? and 3) Does the reader correct (or attempt to correct) those miscues that don't fit in context?"[15] The various taxonomies and forms used to code miscues attempt to generate this information. If the student is making miscues which don't go with the surrounding context or which alter the meaning of the passage then he or she needs help in using context to generate meaning. The teacher can use a number of strategies to give this help.

For example, Dorothy Watson discusses a student named Tim who relied heavily on phonics and didn't use semantic or syntactic strategies to take advantage of the context of a reading.[16] The analysis of Tim's miscues showed that he often substituted words that were similar graphically to the text but which did not fit the context in any meaningful way. He substituted "pound" for "proud" in the phrase, "he was so proud of" and "smile" for "small" in "the family's small farm." These miscues contributed to a low comprehension score. One method of instruction that would help Tim overcome these difficulties would be to have the teacher read aloud to Tim and pause frequently. Tim would then fill in the pauses. After Tim became adept at this, the teacher could

block out highly predictable words in Tim's text and let him guess at the meanings from the context. As Tim gets better and better at this exercise, the words blocked out can be the ones that are less predictable. This exercise, which is really a variation on the cloze procedure, encourages Tim to rely on semantic and syntactic rather than graphic cues in his reading.

A less formal way of helping Tim would be simply to encourage him to ask himself if his reading made sense to him. If it didn't make sense, the teacher and Tim would talk about ways he could gain meaning from the text. Finally, the miscue analysis would tell the teacher if Tim habitually confused two words--for example "thought" and "through." If this were the case, the teacher would devise lessons that highlighted the difference in meaning and form of these two words. All of these strategies deal with the total reading process of each reader and attempt to help the reader become proficient in the use of all the reading cues available to him or her. As Goodman warns about miscue analysis, it "is only useful to the extent that the user comes to view reading as the psycholinguistic process it is. Miscue analysis involves its user in examining the observed behavior of oral readers as an interaction between language and thought, as a process of constructing meaning from a graphic display."[17]

Of course, by now you may have been able to guess one major drawback in miscue analysis--it can be very time-consuming. This reason alone is enough to explain why Goodman's work has not had much influence on the great mass of reading instruction in the United States. As Patrick Groff says of that great staple of reading instruction, the basel reader, "This most influential guide to the teaching of reading has included more and more phonics and a greater emphasis on a systematic approach to the teaching of reading during the very period of time that the number of collegiate devotees to Goodman's denunciation of these two ideas has grown in size."[18] Groff goes on to point out other, theoretical objections to Goodman's theories, including "its lack of correspondence

to what research says about the effectiveness of phonics instruction" and the questionable nature of Goodman's inherent assumption that what a reader does aloud mirrors what he does when reading silently.

But to throw out Goodman's ideas about how reading should be taught because of these questions seems foolish to me. Goodman never says that phonics aren't important. He simply wants to give them their proper place within the reading process. And his insights into the difference between efficient and inefficient readers--that "as readers become more efficient, they use less and less graphic input"[19]--are important for college teachers of reading. Phonics has its place at the beginning of reading instruction, perhaps even for some college readers I have had as students, but most college students have mastered phonics and can sound out unknown words. These students need help in becoming more efficient readers and Goodman offers the insights that will enable us to help them.

NOTES

[1] Kenneth S. Goodman, "The Psycholinguistic Nature of the Reading Process," in The Psycholinguistic Nature of the Reading Process, ed. Kenneth S. Goodman (Detroit: Wayne State Univ. Press, 1973), p. 15.

[2] Goodman, "The Psycholinguistic Nature of the Reading Process," p. 26.

[3] Frank Smith and Kenneth S. Goodman, "On the Psycholinguistic Method of Teaching Reading," in Psycholinguistics and Reading, ed. Frank Smith (New York: Holt, Rinehart and Winston, 1973), p. 179.

[4] Frank Smith, "Psycholinguistics and Reading," in Psycholinguistics and Reading, p. 4.

[5] Smith, p. 6.

[6] Smith, p. 7.

[7] Paul A. Kolers, "Three Stages of Reading," in Psycholinguistics and Reading, pp. 30-31.

[8] Kolers, "Three Stages of Reading," p. 31.

[9] Frank Smith, "Decoding: The Great Fallacy," in Psycholinguistics and Reading, p. 82.

[10] Kolers, "Three Stages of Reading," pp. 46-47.

[11] Paul A. Kolers, "Reading is Only Incidentally Visual," in Psycholinguistics and the Teaching of Reading, eds. Kenneth S. Goodman and James T. Fleming (Newark: Del.: International Reading Association, 1969), p. 13.

[12] Kolers, "Three Stages of the Reading Process," pp. 47-48, and "Reading Is Only Incidentally Visual," pp. 12-14.

[13] This entire description of miscue analysis is taken from an article by Kenneth Goodman, "Miscues: Windows on the Reading Process," in Miscue Analysis: Applications to Reading Instruction, ed. Kenneth Goodman (Urbana, Ill.: National Council of Teachers of English, 1976), pp. 7-8.

[14] Goodman, "Miscues," p. 8.

[15] Grammar For Teachers: Perspectives and Definitions (Urbana, Ill.: National Council of Teachers of English, 1979), p. 45.

[16] Dorothy Watson, "Helping the Reader: From Miscue Analysis to Strategy Lessons," in Miscue Analysis: Applications to Reading Instruction, ed. Kenneth Goodman (Urbana, Ill.: National Council of Teachers of English, 1976), pp. 103 ff.

[17] Goodman, "Miscues," p. 4.

[18] Patrick Groff, "Goodman and His Critics," Reading World, 18 (1979), p. 382.

[19] Goodman, "Miscues," p. 9.

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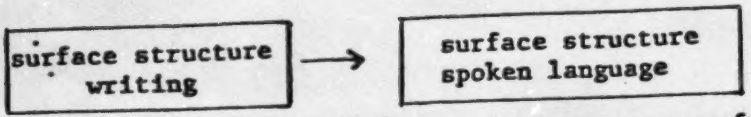
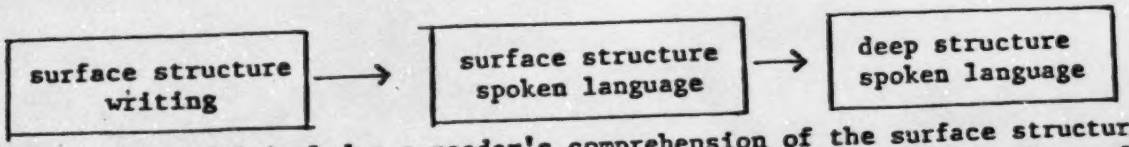
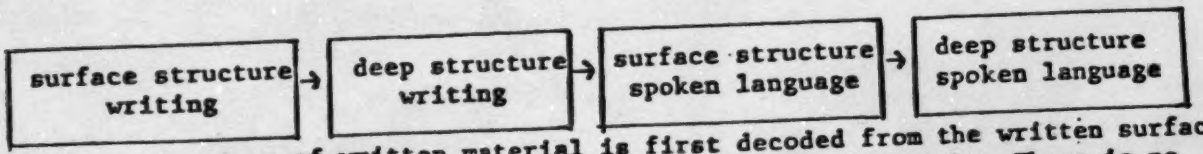
## Theories of Reading Models*

1. 

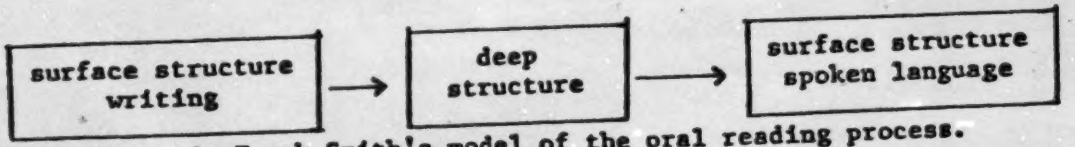

This "conventional" model of the reading process fails to take into consideration the reader's decoding of the surface structure into meaning (deep structure).

2. 

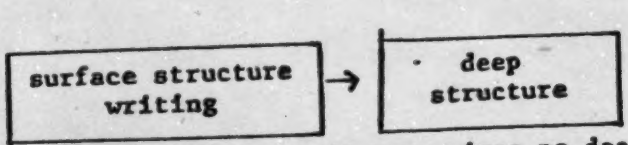

While this model includes a reader's comprehension of the surface structure (i.e., understanding of the deep structure of the spoken language), that phase of the process is misplaced. The work of Smith and Kolers strongly suggests that it is not possible for a proficient reader to decode the surface structure of writing into the surface structure of spoken language without first decoding the deep structure of the graphic symbols.

3. 


The deep structure of written material is first decoded from the written surface structure and then recoded into the surface structure of speech. There is no need to extract meaning twice, however, since both deep structures are the same.

4. 


This, then, is Frank Smith's model of the oral reading process.

5. 


Proficient silent reading requires no decoding of deep structure into oral surface structure. In fact, subvocalizing slows down the reading rate and often tends to decrease comprehension.

*Smith, Frank. Psycholinguistics and Reading. New York: Holt, Rinehart and Winston, 1973.